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EFFECT OF INDUSTRIAL COMPENSATION ON NAVY ENLISTED RETENTION - --ETC(U)
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P.O. Box 247
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(11) 12 April 12, 1979

(6) EFFECT OF INDUSTRIAL COMPENSATION ON NAVY ENLISTED RETENTION - MODEL DEVELOPMENT.

(15) Contract No. N00014-78-C-0452

(9) Technical Report No. 1

(14) TR-1

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(12) 4p.

The purpose of this technical report is to indicate the results of a preliminary test of the model developed for the study. The study seeks to determine the extent to which compensation both inside and outside the Navy influences retention of enlisted personnel in various Navy ratings.

The preliminary test of the model involved nine major Navy occupational categories which were collapsed from seventeen occupational categories for which reenlistment data were available for the period 1968 to 1977 in the monthly editions of Navy Military Personnel Statistics on first-term eligibles and reenlistments.

The relationships were estimated using the following regression equation:

$$\ln Q_i = \ln a + b \ln Q_m + c \ln (W_j/W_p)$$

where Q_i is the quit rate for occupational category i in the Navy.

Q_m is the quit rate for all manufacturing in the private sector of the economy.

W_j/W_p is a relative compensation variable.

W_p is the hourly wage variable in all manufacturing in the private sector.

Two Navy wage measures were used in the preliminary test: one was Basic Pay and the other, Regular Military Compensation (RMC).

ln a, b, and c are the parameters of the model. They were estimated with 1968-1977 quarterly data on first-termers using the two compensation measures

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for the following nine occupational categories: Deck, Ordnance, Electronics, Administration, Seamen, Engine and Hull, Construction, Aviation, and Medical and Dental.

First using Basic Pay for W, the estimates of ln a, b, and c are listed in Table I. R^2's are all around 0.50, indicating that about half of the variation in quits of first-term eligibles can be accounted for by the business cycle and the Navy-private sector compensation ratio. Since the model uses natural log values of the variables, the parameters b and c are elasticities. The elasticities of quits for changes in relative compensation in the Navy range from -2.08 for eligibles in electronics to a low of -.78 for eligibles in construction. These coefficients indicate that a one per cent increase in relative compensation, i.e. W_j/W_p, would decrease the quit rate by .78 per cent for Construction, and by 2.98 per cent for Electronics. All coefficients are statistically significant at least at the ten per cent level and most have a higher level of significance (i.e., at five per cent or one per cent level).

The parameters of the model were estimated again with the only change being the use of RMC as the compensation variable for the Navy occupational categories instead of Basic Pay. The results are listed in Table II. When RMC is used instead of Basic Pay, the R^2's for the seven occupational categories fall, indicating that less of the variation in quits is explained by the business cycle and relative compensation. When Basic Pay is used, the estimates of parameter b, the elasticity of Navy quits with respect to private sector quits, are all around 1.0, indicating that attrition in Navy ratings is about comparable to that of the private sector over the business cycle. When RMC is used, estimates of this parameter fall for all ratings except Electronics

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and become statistically less significant. Also, when RMC is used instead of Basic Pay, the estimates of c fall for all of the seven Navy occupational categories.

The estimates of coefficients using these two measures of compensation in the Navy can be compared most easily in Table III, where Equation 1 uses Basic Pay, and Equation 2, RMC. The uniform decline in the estimates of c for all occupational categories when RMC is used instead of Basic Pay indicates that Navy personnel in the seven occupational categories (although this is more true in some than in others) are more sensitive in their quit-no quit decisions to changes in Basic Pay than to changes in RMC. This suggests that the value to enlisted personnel of an increase of a given dollar amount in Basic Pay is greater than an equivalent increase in RMC.

A possible policy implication from this preliminary finding, therefore, is that even a partial shift in the amount of compensation from RMC (other than Basic Pay) to Basic Pay would result in greater retention of enlisted personnel. Clearly, further investigation involving disaggregation in occupational categories and related data is called for before any definite conclusions can be drawn. The study is proceeding in this direction.

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TABLE 1

RELATIVE COMPENSATION AND QUITS IN NAVY
OCCUPATIONAL CATEGORIES

1968-1 to 1977-4

Regression Equation: $\ln Q_i = \ln a + b \ln Q_m + c \ln (Wj/Wp_i)$

Where: Q_j is the quit rate (ratio of non-reenlistments to eligibles) in the occupational category.

Q_m is the quit rate for all manufacturing in the private sector.

(Wj/Wp) is the rate of E-4 Basic Pay to private sector earnings (average earnings in all manufacturing).

Results of the Regression Analysis

Occupational Category	Constant Term in a	b	c	$\bar{R}^2$	D-W
1. Deck	0.1434 (0.96)	1.0499** (10.80)	-0.9590** (-2.36)	0.43	1.69
2. Ordnance	0.1562 (0.63)	0.8302* (5.19)	-1.6145** (-2.41)	0.43	2.37
3. Electronics	-1.3243 (-1.25)	1.0493* (3.13)	-2.0772* (-3.87)	0.56	0.90
4. Administration	0.1359 (0.87)	1.0380* (10.17)	-0.9344** (-2.19)	0.47	1.51
5. Seaman	0.1091 (0.78)	1.1489* (12.71)	-0.8260** (-2.18)	0.45	1.16
6. Engine and Hull	0.1053 (0.65)	1.0503* (9.94)	-0.9847** (-2.23)	0.44	1.54
7. Construction	0.1759 (0.87)	1.1262* (11.33)	-0.7846*** (-1.71)	0.41	1.11
8. Aviation	0.1426 (0.90)	1.0524* (10.24)	-0.8946 (-2.08)	0.46	1.44
9. Medical and Dental	0.0692 (0.45)	1.0759* (10.82)	-1.0572** (-2.54)	0.45	1.55

t values are in parentheses below coefficients
* indicates significance at the 1% level
** indicates significance at the 5% level
*** indicates significance at the 10% level

TABLE 2

RELATIVE COMPENSATION AND QUITS IN NAVY
OCCUPATIONAL CATEGORIES

1968-1 to 1977-4

Regression Equation: $\ln Q_i = \ln a + b \ln Q_m + c\ (Wj/Wp_i)$

Where: Q_i is the quit rate (ratio of non-reenlistments to eligibles) in the occupational category.

Q_m is the quit rate for all manufacturing.

Wj/Wp_i is the ratio of E-4 Regular Military Compensation (i.e. Basic Pay + housing allowances, subsistence and tax advantages) to private sector earnings (average earnings in all manufacturing).

Results of the Regression Analysis

Occupational Category	Constant Term in a	b	c	$\bar{R}^2$	D-W
1. Deck	3.1412* (10.47)	0.3503* (3.73)	-0.3899** (-2.22)	0.34	0.77
2. Ordnance	2.4302* (4.47)	0.4832* (2.84)	-0.6337** (-1.98)	0.25	0.99
3. Electronics	-2.1392*** (-1.74)	1.6615* (4.33)	-1.3399*** (-1.86)	0.40	0.75
4. Administration	3.3611* (11.76)	0.2726* (3.05)	-0.4498** (-2.68)	0.32	0.83
5. Seaman	3.9797* (23.99)	0.1498* (2.88)	-0.2932* (-3.01)	0.32	1.03
6. Engine and Hull	3.4422* (10.26)	0.2443** (2.33)	-0.5162** (-2.62)	0.26	0.84
7. Construction	4.3377* (10.21)	-0.0198 (-0.15)	-0.6532** (-2.62)	0.13	0.60
8. Aviation	3.5232* (12.20)	0.2325** (2.57)	-0.5153* (-3.04)	0.31	0.78
9. Medical and Dental	3.8400* (15.59)	0.1450*** (1.88)	-0.3997* (-2.77)	0.23	1.04

t values are in parentheses below coefficients
* indicates significance at the 1% level
** indicates significance at the 5% level
*** indicates significance at the 10% level

TABLE 3

RELATIVE COMPENSATION AND QUITS IN NAVY
OCCUPATIONAL CATEGORIES

1968-1 to 1977-4

Coefficients of Regression

Equation 1: Relative Compensation Wj/Wp (ratio of E-4 Basic Pay to average earnings in all manufacturing).

Equation 2: Relative Compensation Wj/Wp (ratio of E-4 Regular Military Compensation, i.e. E-4 Basic Pay + housing allowances, subsistence and tax advantages to average earnings in all manufacturing).

Occupational Category	a	b	c
1. Deck			
Equation 1	1.1541	1.0499	-0.9590
Equation 2	23.1325	0.3503	-0.3899
2. Ordnance			
Equation 1	1.1690	0.8302	-1.6145
Equation 2	11.3611	0.4832	-0.6337
3. Electronics			
Equation 1	0.2660	1.0493	-2.0772
Equation 2	0.1178	1.6615	-1.3398
4. Administration			
Equation 1	1.1456	1.0380	-0.9344
Equation 2	28.8217	0.2726	-0.4498
5. Seaman			
Equation 1	1.1153	1.1489	-0.8260
Equation 2	53.4987	0.1498	-0.2932
6. Engine and Hull			
Equation 1	1.1110	1.0503	-0.9847
Equation 2	31.2555	0.2443	-0.5162
7. Construction			
Equation 1	1.1923	1.1262	-0.7846
Equation 2	76.5335	-0.0198	-0.6532
8. Aviation			
Equation 1	1.1533	1.0524	-0.8946
Equation 2	33.8940	0.2325	-0.5153
9. Medical and Dental			
Equation 1	1.5714	1.0758	-1.0572
Equation 2	46.5305	0.1450	-0.3997